**Murder and a Meal Background**

**Food Chemistry Testing**

**for Sugar, Starch, Protein, or Fat**

The nutrients in the food you eat supply your body with energy for growth and repair. These principle substances include carbohydrates, proteins, fats, minerals and vitamins.

Carbohydrates make up a group of organic compounds that include sugars and starches, which are important in supplying your body with energy. Some starches provide your body with indigestible fiber, or roughage, which aids digestion.

Proteins are organic compounds important for growth and repair. They are made of amino acids. Lipids (e.g. fats) are organic compounds that can supply as much as four times the amount of energy as carbohydrates or proteins.

We can test for the presence of these important compounds in food by using chemical reagents that react in predictable ways in the presence of these nutrients.

Outlined below are just the basic test procedures required to use these test solutions.

**Each test needs a control test tube on the rack before you begin a test.**

Food Test 1: Sugar test-Benedict's solution

Benedict's solution is used to test for simple sugars, such as glucose. It is a clear blue solution of sodium and copper salts. In the presence of simple sugars, the blue solution changes color to green, yellow, and brick-red, depending on the amount of sugar.

**What to do:**

1. Mix small amount of the sample with distilled water to make a test liquid.

2. To a test tube, add 40 drops of liquid to be tested.

3. Add 30 drops of Benedict's solution to each test tube. Carefully heat the test tubes by suspending in a hot water bath at about 40-50 degrees celsius for five minutes. Place test tube in large beaker on hot plate. USE SAFETY GEAR!

4. Note any color change. If sugar is present solution will turn green, yellow, or brick-red, depending on sugar concentration.

Food Test 2: Protein - Biuret solution

Biuret solution is used to identify the presence of protein. Biuret reagent is a blue solution that, when it reacts with protein, will change color to pink-purple.

**What to do:**

1. To a test tube, add 40 drops of liquid to be tested.

2. If testing more than one liquid, label each test tube with a marker.

3. Add 50 drops of Biuret reagent solution to each test tube. Close tube and shake gently to mix.

4. Wait 5-10 minutes to check for the result.

5. Note any color change. Proteins will turn solution pink or purple.

Food Test 3: Fat - Sudan III stain

Sudan III is used to identify the presence of lipids in liquids. It will stain fat cells red.

**What to do:**

1. To a test tube, add equal parts of test liquid and water to fill about one-third full.

2. Add 30 drops of Sudan III stain to each test tube. Close tube. Shake gently to mix.

3. A red-stained oil layer will separate out and float on the water surface if fat is present.

Food Test 4- Carbohydrate- Starch Test

Test for Starch - Iodine solution

**What to do:**

1. Put 10 ml of solution in a test tube.

2. Add 5 drops of iodine.

3. A bluish black/ dark purple color indicates a positive test for starch.